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## Cover Page Footnote

1 Barr, K. R., A. G. Vandergast, and B. E. Kus. 2013. Genetic structure in the cactus wren in coastal southern California. U.S. Geological Survey, Reston, VA. 27 pp. Available from: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=65007> via the Internet. Accessed 20 February, 2016

## Site Fidelity of a Coastal Cactus Wren (*Camphylorhynchus brunneicapillus*) on the Palos Verdes Peninsula

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The coastal cactus wren (*Camphylorhynchus brunneicapillus*) is a charismatic, though sedentary bird that inhabits thickets of prickly pear (*Opuntia littoralis* and *O. oricola*) and coastal cholla (*Cylindropuntia prolifera*) in the coastal sage scrub and chaparral habitats of southern California and Baja California, Mexico<sup>1</sup> (Rea and Weaver 1990). Urbanization that took place during the past century, with its attendant habitat loss, has deleteriously impacted this species. On the Palos Verdes Peninsula, coastal cactus wrens occupy cactus habitat contained within the five-hectare Palos Verdes Nature Preserve (Preserve) and undeveloped tracts interspersed between the Preserve and urban development. As such, it is an isolated population that faces threats through loss of genetic diversity.

Recently, two independent investigations have converged to demonstrate a remarkable instance of site fidelity by a single individual. During 2012 and 2013, biologists from the U. S. Geological Survey sampled 620 coastal cactus wrens in Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties to assess the impacts of habitat fragmentation using contemporary genetic analysis (Barr et al. 2015). Birds that were captured for the genetic analysis were banded to prevent re-sampling individuals<sup>1</sup>. A total of eight individuals were captured and banded in the Preserve during the second year of this study. Each individual's location and band number was recorded at capture and blood was drawn for the genetic analysis.

In 2014, the Palos Verdes Peninsula Land Conservancy (Conservancy) initiated a Citizen Science Cactus Wren program to utilize volunteers to observe the coastal cactus wrens within the Preserve. The Conservancy manages and restores habitat within the Preserve for several special status species, as well as the coastal cactus wren. The program was designed to return information about how the wrens utilized their habitat, within both existing habitat and newly established areas of habitat. This is important information for the Conservancy in its mission to restore cactus stands within the Preserve's coastal sage scrub habitat.

The volunteers conducted weekly surveys within the Preserve's Alta Vicente Reserve from March through July during the breeding seasons in 2014 and 2015. The surveys were conducted for 20 minute periods at specifically delineated territorial polygons within areas referred to as West and East (Fig. 1). Observations were recorded by the minute and included number of cactus wrens (adult, juvenile, or unknown), presence of predators, and several qualitative behavior patterns from which frequencies could be computed (Table 1). For these surveys, the enthusiastic volunteers took to the field outfitted with binoculars, spotting scopes, and cameras equipped with telephoto lenses.

That coastal cactus wrens spend most of their time moving within the cactus thickets, rising above the cactus for only brief moments, is reflected by the data collected by the Citizen Science

<sup>1</sup> Barr, K. R., A. G. Vandergast, and B. E. Kus. 2013. Genetic structure in the cactus wren in coastal southern California. U.S. Geological Survey, Reston, VA. 27 pp. Available from: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=65007> via the Internet. Accessed 20 February, 2016.

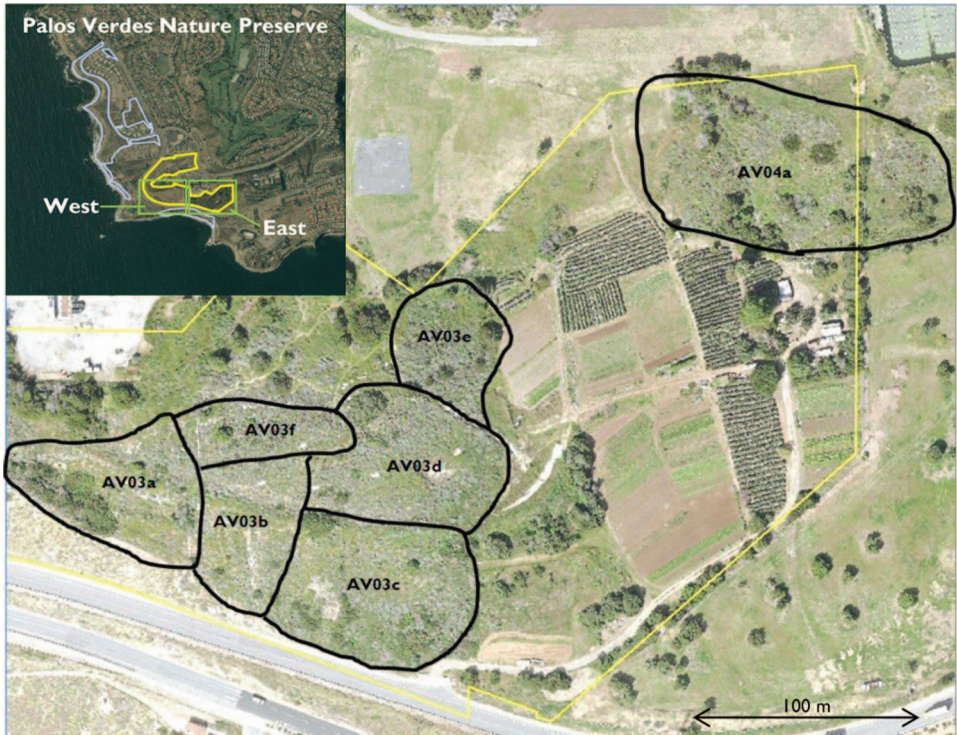


Fig. 1. Alta Vicente West and East are shown in yellow in the upper left-hand box. The territorial polygons are shown in the large map. The farmed cactus is visible as even rows adjacent to polygon AV04a.

Table 1. All observations from the 2015 Citizen Science Cactus Wren Program from 230 twenty-minute surveys at 21 territories at Alta Vicente Reserve from 21 Feb 2015 through 25 Jul 2015. Each territory was observed for 20 minutes and observations recorded by the minute. Occasionally multiple observations occurred within a 1-minute observation interval.

Type of observation	2015	
	Count	Percent
No observation	4101	88.98
Audio observation	65	1.41
Visual observation	213	4.62
Predator observed	32	0.69
Flight out to a different territory	77	1.67
Flight in from a different territory	73	1.58
Defensive/aggressive activity	2	0.04
Copulation	0	0.00
Nesting material in beak	15	0.33
Flight into nest	16	0.35
Flight out of nest	13	0.28
Feeding young in nest	1	0.02
Feeding young out of nest	1	0.02
Total observation intervals	4600	—



Fig. 2. Adult male photographed on 6 Jun 2015 that was banded two years earlier on 12 Jun 2013 as an unknown sex. Image courtesy of Mai Lee.

volunteers in 2015. Aural and visual cactus wren observations occurred at a combined frequency of 6.0% (Table 1). Birds were observed flying into or out of their territories during 2.3% of the observations, whereas activities related to rearing their brood were observed during 1.0% of the observations.

Variations in the throat and breast patterns were used by Citizen Science volunteers to track individuals. In 2014, after witnessing a pair copulate in the West, their distinctive color patterns enabled the volunteers to determine the birds' respective sex. Subsequently, the volunteers tracked the behavior of the pair through their courtship, nesting, and the successful rearing of two chicks. Throughout the nesting season, vocalization and defensive behaviors were primarily the domain of the male while the female tended to the nest and chicks. After fledging, one chick was witnessed mimicking its father's boisterous defensive calls, leading to the conclusion that the young individual was also male.

During the 2015 survey, one of the volunteers captured photos of a wren in the East at polygon AV03c. When processing the photos later that day at home, she noticed that the bird was banded with a single, silver band on its left, lower leg (Fig. 2). Similarly, I photographed the same individual four weeks later on July 4, 2015 in polygon AV03f, and only noticed the band in the photographs, for it was not visible with the naked eye or with binoculars. Each band has a unique number, but unfortunately, the number on the band could not be discerned in any of the photographs.

Earlier in 2013, two cactus wrens captured in polygon AV03c were banded with silver bands on their lower left leg, one a female and the other unknown (Table 2). Due to the obscured band

Table 2. List of cactus wrens captured that were banded at the Alta Vicente Reserve following blood drawn for genetic analysis during the 2012-2013 USGS field effort (from B. Kus (USGS personal communication). All coordinates are in WGS84.

Site	Date banded	Age/Sex	Latitude	Longitude	Band ID*
AV1c	30-Jul-12	Hatch year/Unk	33.74402	-118.40582	DGDG/YEYE : WHWH/Mre
AV2c	30-Jul-12	Hatch year/Unk	33.74411	-118.40117	DGDG/YEYE : YEYE/Mre
AV03c	12-Jun-13	Adult/Unk	33.74257	-118.40328	-/Msi : -/-
AV04a	12-Jun-13	Adult/Female	33.74401	-118.40144	-/Msi : -/-
AV04a	12-Jun-13	Adult/Male	33.74401	-118.40144	-/- : -/Msi

\* Top Left Leg/Bottom Left Leg : Top Right Leg/Bottom Right Leg.

Metal bands: Mre = federal red anodized aluminum band, Msi = federal silver aluminum band. Darvic bands: DGDG = dark green, WHWH = white, YEYE = yellow.

number in the individual photographed during the Citizen Science surveys, we could not directly determine which bird from the 2013 banding effort was being observed. However, the banded individual's behavior indicated that it was a male. The bird was very noisy, acting defensively in the presence of Citizen Science observers. It moved away from its youngsters that were foraging nearby, circling around to perch on a tree tobacco (*Nicotiana glauca*), and vocalize defensively. This was behavior very similar to that displayed by the male observed in 2014 by the Citizen Science observers. Based upon the similar behavior, it was concluded that this bird in the East, originally marked as an unknown at the time of banding, was certainly a male. Scarlett Howell (USGS, personal communication) concurred that this behavior is characteristic of males and that the banded bird was likely the individual identified by them as unknown in Table 2.

The banded bird observed during the 2015 survey was seen at locations throughout the east, including the same polygon where it was banded and later photographed (AV03c). In May, this male was observed foraging for its nestlings, flying out of polygon AV04a into farmed cactus and back to the nest. Later in June, both adults were observed leading their chicks out of their natal area (AV04a) and into a farmed patch of cactus (*Opuntia ficus-indica*). Through June and July, the family was frequently observed in the vicinity of the very polygon in which the male was captured for banding.

Two years after banding, this male was operating in the very same area that it was originally captured, exhibiting a remarkable degree of fidelity to the site. Although cactus wrens are known to be a sedentary species, rarely flying more than one km in distance (Rea and Weaver 1990), this observation provides supporting evidence that this species is indeed, a sedentary bird.

### Acknowledgements

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